



SEQUENCE LISTING

<110> Gennaro, Maria L.

<120> PROTEINS EXPRESSED BY MYCOBACTERIUM
TUBERCULOSIS AND NOT BY BCG AND THEIR USE AS DIAGNOSTIC
REAGENTS AND VACCINES

<130> 07763-043001

<140> 10/009,383

<141> 2001-11-02

<150> PCT/US00/12257

<151> 2000-05-04

<150> 60/132,505

<151> 1999-05-04

<160> 16

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 591

<212> PRT

<213> Mycobacterium tuberculosis

A3

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Leu	Thr	Asn	Pro	Val	Pro	Leu	Asn	Glu	Leu	Ile	Ala	Arg	Asp	Arg	Arg
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Gln	Pro	Leu	Arg	Phe	Ala	Leu	Gly	Ile	Met	Asp	Glu	Pro	Arg	Arg	His
	50					55				60					
Leu	Gln	Asp	Val	Trp	Gly	Val	Asp	Val	Ser	Gly	Ala	Gly	Gly	Asn	Ile
65					70					75				80	
Gly	Ile	Gly	Gly	Ala	Pro	Gln	Thr	Gly	Lys	Ser	Thr	Leu	Leu	Gln	Thr
			85					90						95	
Met	Val	Met	Ser	Ala	Ala	Ala	Thr	His	Ser	Pro	Arg	Asn	Val	Gln	Phe
		100						105					110		
Tyr	Cys	Ile	Asp	Leu	Gly	Gly	Gly	Gly	Leu	Ile	Tyr	Leu	Glu	Asn	Leu
	115						120					125			
Pro	His	Val	Gly	Gly	Val	Ala	Asn	Arg	Ser	Glu	Pro	Asp	Lys	Val	Asn
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Arg	Val	Val	Ala	Glu	Met	Gln	Ala	Val	Met	Arg	Gln	Arg	Glu	Thr	Thr
145				150						155				160	
Phe	Lys	Glu	His	Arg	Val	Gly	Ser	Ile	Gly	Met	Tyr	Arg	Gln	Leu	Arg
			165					170					175		
Asp	Asp	Pro	Ser	Gln	Pro	Val	Ala	Ser	Asp	Pro	Tyr	Gly	Asp	Val	Phe
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Leu	Ile	Ile	Asp	Gly	Trp	Pro	Gly	Phe	Val	Gly	Glu	Phe	Pro	Asp	Leu
	195					200					205				
Glu	Gly	Gln	Val	Gln	Asp	Leu	Ala	Ala	Gln	Gly	Leu	Ala	Phe	Gly	Val

210	215	220
His Val Ile Ile Ser Thr Pro Arg Trp Thr Glu Leu Lys Ser Arg Val		
225	230	235
Arg Asp Tyr Leu Gly Thr Lys Ile Glu Phe Arg Leu Gly Asp Val Asn		240
	245	250
Glu Thr Gln Ile Asp Arg Ile Thr Arg Glu Ile Pro Ala Asn Arg Pro		255
	260	265
Gly Arg Ala Val Ser Met Glu Lys His His Leu Met Ile Gly Val Pro		270
	275	280
Arg Phe Asp Gly Val His Ser Ala Asp Asn Leu Val Glu Ala Ile Thr		285
	290	295
Ala Gly Val Thr Gln Ile Ala Ser Gln His Thr Glu Gln Ala Pro Pro		300
305	310	315
Val Arg Val Leu Pro Glu Arg Ile His Leu His Glu Leu Asp Pro Asn		320
	325	330
Pro Pro Gly Pro Glu Ser Asp Tyr Arg Thr Arg Trp Glu Ile Pro Ile		335
	340	345
Gly Leu Arg Glu Thr Asp Leu Thr Pro Ala His Cys His Met His Thr		350
	355	360
Asn Pro His Leu Leu Ile Phe Gly Ala Ala Lys Ser Gly Lys Thr Thr		365
	370	375
Ile Ala His Ala Ile Ala Arg Ala Ile Cys Ala Arg Asn Ser Pro Gln		380
385	390	395
Gln Val Arg Phe Met Leu Ala Asp Tyr Arg Ser Gly Leu Leu Asp Ala		400
	405	410
Val Pro Asp Thr His Leu Leu Gly Ala Gly Ala Ile Asn Arg Asn Ser		415
	420	425
Ala Ser Leu Asp Glu Ala Val Gln Ala Leu Ala Val Asn Leu Lys Lys		430
	435	440
Arg Leu Pro Pro Thr Asp Leu Thr Thr Ala Gln Leu Arg Ser Arg Ser		445
	450	455
Trp Trp Ser Gly Phe Asp Val Val Leu Leu Val Asp Asp Trp His Met		460
465	470	475
Ile Val Gly Ala Ala Gly Gly Met Pro Pro Met Ala Pro Leu Ala Pro		480
	485	490
Leu Leu Pro Ala Ala Ala Asp Ile Gly Leu His Ile Ile Val Thr Cys		495
	500	505
Gln Met Ser Gln Ala Tyr Lys Ala Thr Met Asp Lys Phe Val Gly Ala		510
	515	520
Ala Phe Gly Ser Gly Ala Pro Thr Met Phe Leu Ser Gly Glu Lys Gln		525
	530	535
Glu Phe Pro Ser Ser Glu Phe Lys Val Lys Arg Arg Pro Pro Gly Gln		540
545	550	555
Ala Phe Leu Val Ser Pro Asp Gly Lys Glu Val Ile Gln Ala Pro Tyr		560
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Ile Glu Pro Pro Glu Glu Val Phe Ala Ala Pro Pro Ser Ala Gly		575
	580	585
		590

<210> 2

<211> 99

<212> PRT

<213> Mycobacterium tuberculosis

<400> 2

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Thr	Ser	Val	Thr	Gly	Leu	Val	Pro	Ala	Gly	Ala	Asp	Glu	Val	Ser	Ala
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Gln	Ala	Ala	Thr	Ala	Phe	Thr	Ser	Glu	Gly	Ile	Gln	Leu	Leu	Ala	Ser
	50					55					60				
Asn	Ala	Ser	Ala	Gln	Asp	Gln	Leu	His	Arg	Ala	Gly	Glu	Ala	Val	Gln
65					70				75						80
Asp	Val	Ala	Arg	Thr	Tyr	Ser	Gln	Ile	Asp	Asp	Gly	Ala	Ala	Gly	Val
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Phe	Ala	Glu													

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<211> 368

<212> PRT

<213> Mycobacterium tuberculosis

<400> 3

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			20					25					30		
Thr	Leu	Ser	Ala	Ala	Leu	Asp	Ala	Gln	Ala	Val	Glu	Leu	Thr	Ala	Arg
	35					40					45				
Leu	Asn	Ser	Leu	Gly	Glu	Ala	Trp	Thr	Gly	Gly	Gly	Ser	Asp	Lys	Ala
	50				55						60				
Leu	Ala	Ala	Ala	Thr	Pro	Met	Val	Val	Trp	Leu	Gln	Thr	Ala	Ser	Thr
65					70				75						80
Gln	Ala	Lys	Thr	Arg	Ala	Met	Gln	Ala	Thr	Ala	Gln	Ala	Ala	Ala	Tyr
			85					90						95	
Thr	Gln	Ala	Met	Ala	Thr	Thr	Pro	Ser	Leu	Pro	Glu	Ile	Ala	Ala	Asn
			100					105					110		
His	Ile	Thr	Gln	Ala	Val	Leu	Thr	Ala	Thr	Asn	Phe	Phe	Gly	Ile	Asn
	115						120					125			
Thr	Ile	Pro	Ile	Ala	Leu	Thr	Glu	Met	Asp	Tyr	Phe	Ile	Arg	Met	Trp
	130					135					140				
Asn	Gln	Ala	Ala	Leu	Ala	Met	Glu	Val	Tyr	Gln	Ala	Glu	Thr	Ala	Val
145					150					155					160
Asn	Thr	Leu	Phe	Glu	Lys	Leu	Glu	Pro	Met	Ala	Ser	Ile	Leu	Asp	Pro
			165					170						175	
Gly	Ala	Ser	Gln	Ser	Thr	Thr	Asn	Pro	Ile	Phe	Gly	Met	Pro	Ser	Pro
		180					185						190		
Gly	Ser	Ser	Thr	Pro	Val	Gly	Gln	Leu	Pro	Pro	Ala	Ala	Thr	Gln	Thr
	195						200					205			
Leu	Gly	Gln	Leu	Gly	Glu	Met	Ser	Gly	Pro	Met	Gln	Gln	Leu	Thr	Gln
	210					215					220				
Pro	Leu	Gln	Gln	Val	Thr	Ser	Leu	Phe	Ser	Gln	Val	Gly	Gly	Thr	Gly
225					230					235					240
Gly	Gly	Asn	Pro	Ala	Asp	Glu	Glu	Ala	Ala	Gln	Met	Gly	Leu	Leu	Gly
			245						250					255	
Thr	Ser	Pro	Leu	Ser	Asn	His	Pro	Leu	Ala	Gly	Gly	Ser	Gly	Pro	Ser
			260					265					270		
Ala	Gly	Ala	Gly	Leu	Leu	Arg	Ala	Glu	Ser	Leu	Pro	Gly	Ala	Gly	Gly
	275						280					285			
Ser	Leu	Thr	Arg	Thr	Pro	Leu	Met	Ser	Gln	Leu	Ile	Glu	Lys	Pro	Val
	290					295					300				
Ala	Pro	Ser	Val	Met	Pro	Ala	Ala	Ala	Ala	Gly	Ser	Ser	Ala	Thr	Gly

305		310		315		320									
Gly	Ala	Ala	Pro	Val	Gly	Ala	Gly	Ala	Met	Gly	Gln	Gly	Ala	Gln	Ser
				325					330					335	
Gly	Gly	Ser	Thr	Arg	Pro	Gly	Leu	Val	Ala	Pro	Ala	Pro	Leu	Ala	Gln
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<210> 4
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 <212> PRT
 <213> Mycobacterium tuberculosis

<400> 4															
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			20					25					30		
Glu	Ser	Thr	Ala	Gly	Ser	Leu	Gln	Gly	Gln	Trp	Arg	Gly	Ala	Ala	Gly
		35					40					45			
Thr	Ala	Ala	Gln	Ala	Ala	Val	Val	Arg	Phe	Gln	Glu	Ala	Ala	Asn	Lys
		50				55					60				
Gln	Lys	Gln	Glu	Leu	Asp	Glu	Ile	Ser	Thr	Asn	Ile	Arg	Gln	Ala	Gly
65					70					75				80	
Val	Gln	Tyr	Ser	Arg	Ala	Asp	Glu	Glu	Gln	Gln	Gln	Ala	Leu	Ser	Ser
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Gln	Met	Gly	Phe												
			100												

<210> 5
 <211> 666
 <212> PRT
 <213> Mycobacterium tuberculosis

<400> 5															
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Ala	Pro	Asp	Asp	Met	Ala	Ala	Gln	Pro	Phe	Phe	Asp	Pro	Ser	Ala	Ser
			20					25					30		
Phe	Pro	Pro	Ala	Pro	Ala	Ser	Ala	Asn	Leu	Pro	Lys	Pro	Asn	Gly	Gln
		35					40					45			
Thr	Pro	Pro	Pro	Thr	Ser	Asp	Asp	Leu	Ser	Glu	Arg	Phe	Val	Ser	Ala
	50					55					60				
Pro	Pro	Pro	Pro	Pro	Pro	Pro	Pro	Pro	Pro	Pro	Pro	Pro	Thr	Pro	Met
65					70					75				80	
Pro	Ile	Ala	Ala	Gly	Glu	Pro	Pro	Ser	Pro	Glu	Pro	Ala	Ala	Ser	Lys
				85					90					95	
Pro	Pro	Thr	Pro	Pro	Met	Pro	Ile	Ala	Gly	Pro	Glu	Pro	Ala	Pro	Pro
		100						105					110		
Lys	Pro	Pro	Thr	Pro	Pro	Met	Pro	Ile	Ala	Gly	Pro	Glu	Pro	Ala	Pro
		115				120						125			
Pro	Lys	Pro	Pro	Thr	Pro	Pro	Met	Pro	Ile	Ala	Gly	Pro	Ala	Pro	Thr
	130					135					140				
Pro	Thr	Glu	Ser	Gln	Leu	Ala	Pro	Pro	Arg	Pro	Pro	Thr	Pro	Gln	Thr
145					150					155				160	
Pro	Thr	Gly	Ala	Pro	Gln	Gln	Pro	Glu	Ser	Pro	Ala	Pro	His	Val	Pro
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Ser	His	Gly	Pro	His	Gln	Pro	Arg	Arg	Thr	Ala	Pro	Ala	Pro	Pro	Trp
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Ala	Lys	Met	Pro	Ile	Gly	Glu	Pro	Pro	Pro	Ala	Pro	Ser	Arg	Pro	Ser
		195					200					205			
Ala	Ser	Pro	Ala	Glu	Pro	Pro	Thr	Arg	Pro	Ala	Pro	Gln	His	Ser	Arg
	210					215					220				
Arg	Ala	Arg	Arg	Gly	His	Arg	Tyr	Arg	Thr	Asp	Thr	Glu	Arg	Asn	Val
225				230						235					240
Gly	Lys	Val	Ala	Thr	Gly	Pro	Ser	Ile	Gln	Ala	Arg	Leu	Arg	Ala	Glu
				245					250					255	
Glu	Ala	Ser	Gly	Ala	Gln	Leu	Ala	Pro	Gly	Thr	Glu	Pro	Ser	Pro	Ala
			260					265					270		
Pro	Leu	Gly	Gln	Pro	Arg	Ser	Tyr	Leu	Ala	Pro	Pro	Thr	Arg	Pro	Ala
		275					280					285			
Pro	Thr	Glu	Pro	Pro	Pro	Ser	Pro	Ser	Pro	Gln	Arg	Asn	Ser	Gly	Arg
	290					295					300				
Arg	Ala	Glu	Arg	Arg	Val	His	Pro	Asp	Leu	Ala	Ala	Gln	His	Ala	Ala
305					310					315					320
Ala	Gln	Pro	Asp	Ser	Ile	Thr	Ala	Ala	Thr	Thr	Gly	Gly	Arg	Arg	Arg
				325					330					335	
Lys	Arg	Ala	Ala	Pro	Asp	Leu	Asp	Ala	Thr	Gln	Lys	Ser	Leu	Arg	Pro
			340					345					350		
Ala	Ala	Lys	Gly	Pro	Lys	Val	Lys	Lys	Val	Lys	Pro	Gln	Lys	Pro	Lys
		355					360					365			
Ala	Thr	Lys	Pro	Pro	Lys	Val	Val	Ser	Gln	Arg	Gly	Trp	Arg	His	Trp
	370					375					380				
Val	His	Ala	Leu	Thr	Arg	Ile	Asn	Leu	Gly	Leu	Ser	Pro	Asp	Glu	Lys
385					390					395					400
Tyr	Glu	Leu	Asp	Leu	His	Ala	Arg	Val	Arg	Arg	Asn	Pro	Arg	Gly	Ser
			405						410					415	
Tyr	Gln	Ile	Ala	Val	Val	Gly	Leu	Lys	Gly	Gly	Ala	Gly	Lys	Thr	Thr
			420					425					430		
Leu	Thr	Ala	Ala	Leu	Gly	Ser	Thr	Leu	Ala	Gln	Val	Arg	Ala	Asp	Arg
		435					440					445			
Ile	Leu	Ala	Leu	Asp	Ala	Asp	Pro	Gly	Ala	Gly	Asn	Leu	Ala	Asp	Arg
	450					455					460				
Val	Gly	Arg	Gln	Ser	Gly	Ala	Thr	Ile	Ala	Asp	Val	Leu	Ala	Glu	Lys
465					470					475					480
Glu	Leu	Ser	His	Tyr	Asn	Asp	Ile	Arg	Ala	His	Thr	Ser	Val	Asn	Ala
				485					490					495	
Val	Asn	Leu	Glu	Val	Leu	Pro	Ala	Pro	Glu	Tyr	Ser	Ser	Ala	Gln	Arg
			500					505					510		
Ala	Leu	Ser	Asp	Ala	Asp	Trp	His	Phe	Ile	Ala	Asp	Pro	Ala	Ser	Arg
		515					520					525			
Phe	Tyr	Asn	Leu	Val	Leu	Ala	Asp	Cys	Gly	Ala	Gly	Phe	Phe	Asp	Pro
	530					535					540				
Leu	Thr	Arg	Gly	Val	Leu	Ser	Thr	Val	Ser	Gly	Val	Val	Val	Val	Ala
545					550					555					560
Ser	Val	Ser	Ile	Asp	Gly	Ala	Gln	Gln	Ala	Ser	Val	Ala	Leu	Asp	Trp
			565						570					575	
Leu	Arg	Asn	Asn	Gly	Tyr	Gln	Asp	Leu	Ala	Ser	Arg	Ala	Cys	Val	Val
		580						585					590		
Ile	Asn	His	Ile	Met	Pro	Gly	Glu	Pro	Asn	Val	Ala	Val	Lys	Asp	Leu
	595					600						605			
Val	Arg	His	Phe	Glu	Gln	Gln	Val	Gln	Pro	Gly	Arg	Val	Val	Val	Met
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Pro	Trp	Asp	Arg	His	Ile	Ala	Ala	Gly	Thr	Glu	Ile	Ser	Leu	Asp	Leu

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Leu Asp Pro Ile Tyr Lys Arg Lys Val Leu Glu Leu Ala Ala Ala Leu
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Ser Asp Asp Phe Glu Arg Ala Gly Arg Arg
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<210> 6
<211> 511
<212> PRT
<213> Mycobacterium tuberculosis
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			20					25					30		
Met	Thr	Asp	Leu	Val	Leu	Pro	Ala	Ala	Val	Pro	Met	Glu	Thr	Tyr	Ile
		35				40						45			
Asp	Asp	Thr	Val	Ala	Val	Leu	Ser	Glu	Val	Leu	Glu	Asp	Thr	Pro	Ala
50						55					60				
Asp	Val	Leu	Gly	Gly	Phe	Asp	Phe	Thr	Ala	Gln	Gly	Val	Trp	Ala	Phe
65					70					75					80
Ala	Arg	Pro	Gly	Ser	Pro	Pro	Leu	Lys	Leu	Asp	Gln	Ser	Leu	Asp	Asp
				85					90					95	
Ala	Gly	Val	Val	Asp	Gly	Ser	Leu	Leu	Thr	Leu	Val	Ser	Val	Ser	Arg
			100					105					110		
Thr	Glu	Arg	Tyr	Arg	Pro	Leu	Val	Glu	Asp	Val	Ile	Asp	Ala	Ile	Ala
		115					120					125			
Val	Leu	Asp	Glu	Ser	Pro	Glu	Phe	Asp	Arg	Thr	Ala	Leu	Asn	Arg	Phe
	130					135					140				
Val	Gly	Ala	Ala	Ile	Pro	Leu	Leu	Thr	Ala	Pro	Val	Ile	Gly	Met	Ala
145					150					155					160
Met	Arg	Ala	Trp	Trp	Glu	Thr	Gly	Arg	Ser	Leu	Trp	Trp	Pro	Leu	Ala
			165					170					175		
Ile	Gly	Ile	Leu	Gly	Ile	Ala	Val	Leu	Val	Gly	Ser	Phe	Val	Ala	Asn
			180					185				190			
Arg	Phe	Tyr	Gln	Ser	Gly	His	Leu	Ala	Glu	Cys	Leu	Leu	Val	Thr	Thr
		195				200					205				
Tyr	Leu	Leu	Ile	Ala	Thr	Ala	Ala	Ala	Leu	Ala	Val	Pro	Leu	Pro	Arg
	210					215					220				
Gly	Val	Asn	Ser	Leu	Gly	Ala	Pro	Gln	Val	Ala	Gly	Ala	Ala	Thr	Ala
225					230					235					240
Val	Leu	Phe	Leu	Thr	Leu	Met	Thr	Arg	Gly	Gly	Pro	Arg	Lys	Arg	His
			245					250					255		
Glu	Leu	Ala	Ser	Phe	Ala	Val	Ile	Thr	Ala	Ile	Ala	Val	Ile	Ala	Ala
			260					265					270		
Ala	Ala	Ala	Phe	Gly	Tyr	Gly	Tyr	Gln	Asp	Trp	Val	Pro	Ala	Gly	Gly
		275					280					285			
Ile	Ala	Phe	Gly	Leu	Phe	Ile	Val	Thr	Asn	Ala	Ala	Lys	Leu	Thr	Val
	290					295					300				
Ala	Val	Ala	Arg	Ile	Ala	Leu	Pro	Pro	Ile	Pro	Val	Pro	Gly	Glu	Thr
305					310					315					320
Val	Asp	Asn	Glu	Glu	Leu	Leu	Asp	Pro	Val	Ala	Thr	Pro	Glu	Ala	Thr
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Ser	Glu	Glu	Thr	Pro	Thr	Trp	Gln	Ala	Ile	Ile	Ala	Ser	Val	Pro	Ala

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      355              360              365
Ile Gly Tyr Val Thr Ser Gly Thr Leu Ile Leu Ala Ala Gly Ala Ile
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Ala Val Val Val Arg Gly His Phe Phe Val His Ser Leu Val Val Ala
385              390              395              400
Gly Leu Ile Thr Thr Val Cys Gly Phe Arg Ser Arg Leu Tyr Ala Glu
      405              410              415
Arg Trp Cys Ala Trp Ala Leu Leu Ala Ala Thr Val Ala Ile Pro Thr
      420              425              430
Gly Leu Thr Ala Lys Leu Ile Ile Trp Tyr Pro His Tyr Ala Trp Leu
      435              440              445
Leu Leu Ser Val Tyr Leu Thr Val Ala Leu Val Ala Leu Val Val Val
      450              455              460
Gly Ser Met Ala His Val Arg Arg Val Ser Pro Val Val Lys Arg Thr
465              470              475              480
Leu Glu Leu Ile Asp Gly Ala Met Ile Ala Ala Ile Ile Pro Met Leu
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Leu Trp Ile Thr Gly Val Tyr Asp Thr Val Arg Asn Ile Arg Phe
      500              505              510

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<210> 7

<211> 280

<212> PRT

<213> Mycobacterium tuberculosis

<400> 7

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Val Ser Gly Thr Asp Ser Val Val Ala Ala Ile Asn Glu Thr Met Pro
      35              40              45
Ser Ile Glu Ser Leu Val Ser Asp Gly Leu Pro Gly Val Lys Ala Ala
      50              55              60
Leu Thr Arg Thr Ala Ser Asn Met Asn Ala Ala Ala Asp Val Tyr Ala
65              70              75              80
Lys Thr Asp Gln Ser Leu Gly Thr Ser Leu Ser Gln Tyr Ala Phe Gly
      85              90              95
Ser Ser Gly Glu Gly Leu Ala Gly Val Ala Ser Val Gly Gly Gln Pro
      100              105              110
Ser Gln Ala Thr Gln Leu Leu Ser Thr Pro Val Ser Gln Val Thr Thr
      115              120              125
Gln Leu Gly Glu Thr Ala Ala Glu Leu Ala Pro Arg Val Val Ala Thr
      130              135              140
Val Pro Gln Leu Val Gln Leu Ala Pro His Ala Val Gln Met Ser Gln
145              150              155              160
Asn Ala Ser Pro Ile Ala Gln Thr Ile Ser Gln Thr Ala Gln Gln Ala
      165              170              175
Ala Gln Ser Ala Gln Gly Gly Ser Gly Pro Met Pro Ala Gln Leu Ala
      180              185              190
Ser Ala Glu Lys Pro Ala Thr Glu Gln Ala Glu Pro Val His Glu Val
      195              200              205
Thr Asn Asp Asp Gln Gly Asp Gln Gly Asp Val Gln Pro Ala Glu Val
      210              215              220
Val Ala Ala Ala Arg Asp Glu Gly Ala Gly Ala Ser Pro Gly Gln Gln
225              230              235              240
Pro Gly Gly Gly Val Pro Ala Gln Ala Met Asp Thr Gly Ala Gly Ala

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				245					250					255			
Arg	Pro	Ala	Ala	Ser	Pro	Leu	Ala	Ala	Pro	Val	Asp	Pro	Ser	Thr	Pro		
			260					265						270			
Ala	Pro	Ser	Thr	Thr	Thr	Thr	Leu										
			275				280										

<210> 8

<211> 729

<212> PRT

<213> *Mycobacterium tuberculosis*

<400> 8

Met	Ser	Ile	Thr	Arg	Pro	Thr	Gly	Ser	Tyr	Ala	Arg	Gln	Met	Leu	Asp		
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Pro	Gly	Gly	Trp	Val	Glu	Ala	Asp	Glu	Asp	Thr	Phe	Tyr	Asp	Arg	Ala		
			20				25						30				
Gln	Glu	Tyr	Ser	Gln	Val	Leu	Gln	Arg	Val	Thr	Asp	Val	Leu	Asp	Thr		
		35					40					45					
Cys	Arg	Gln	Gln	Lys	Gly	His	Val	Phe	Glu	Gly	Gly	Leu	Trp	Ser	Gly		
	50					55					60						
Gly	Ala	Ala	Asn	Ala	Ala	Asn	Gly	Ala	Leu	Gly	Ala	Asn	Ile	Asn	Gln		
65					70					75					80		
Leu	Met	Thr	Leu	Gln	Asp	Tyr	Leu	Ala	Thr	Val	Ile	Thr	Trp	His	Arg		
				85					90					95			
His	Ile	Ala	Gly	Leu	Ile	Glu	Gln	Ala	Lys	Ser	Asp	Ile	Gly	Asn	Asn		
			100					105					110				
Val	Asp	Gly	Ala	Gln	Arg	Glu	Ile	Asp	Ile	Leu	Glu	Asn	Asp	Pro	Ser		
		115					120					125					
Leu	Asp	Ala	Asp	Glu	Arg	His	Thr	Ala	Ile	Asn	Ser	Leu	Val	Thr	Ala		
	130					135					140						
Thr	His	Gly	Ala	Asn	Val	Ser	Leu	Val	Ala	Glu	Thr	Ala	Glu	Arg	Val		
145					150					155					160		
Leu	Glu	Ser	Lys	Asn	Trp	Lys	Pro	Pro	Lys	Asn	Ala	Leu	Glu	Asp	Leu		
			165						170					175			
Leu	Gln	Gln	Lys	Ser	Pro	Pro	Pro	Pro	Asp	Val	Pro	Thr	Leu	Val	Val		
			180					185					190				
Pro	Ser	Pro	Gly	Thr	Pro	Gly	Thr	Pro	Gly	Thr	Pro	Ile	Thr	Pro	Gly		
		195					200					205					
Thr	Pro	Ile	Thr	Pro	Gly	Thr	Pro	Ile	Thr	Pro	Ile	Pro	Gly	Ala	Pro		
	210					215						220					
Val	Thr	Pro	Ile	Thr	Pro	Thr	Pro	Gly	Thr	Pro	Val	Thr	Pro	Val	Thr		
225					230					235					240		
Pro	Gly	Lys	Pro	Val	Thr	Pro	Val	Thr	Pro	Val	Lys	Pro	Gly	Thr	Pro		
				245				250						255			
Gly	Glu	Pro	Thr	Pro	Ile	Thr	Pro	Val	Thr	Pro	Pro	Val	Ala	Pro	Ala		
		260						265					270				
Thr	Pro	Ala	Thr	Pro	Ala	Thr	Pro	Val	Thr	Pro	Ala	Pro	Ala	Pro	His		
		275					280						285				
Pro	Gln	Pro	Ala	Pro	Ala	Pro	Ala	Pro	Ser	Pro	Gly	Pro	Gln	Pro	Val		
	290					295					300						
Thr	Pro	Ala	Thr	Pro	Gly	Pro	Ser	Gly	Pro	Ala	Thr	Pro	Gly	Thr	Pro		
305					310					315					320		
Gly	Gly	Glu	Pro	Ala	Pro	His	Val	Lys	Pro	Ala	Ala	Leu	Ala	Glu	Gln		
			325					330						335			
Pro	Gly	Val	Pro	Gly	Gln	His	Ala	Gly	Gly	Gly	Thr	Gln	Ser	Gly	Pro		
			340					345					350				
Ala	His	Ala	Asp	Glu	Ser	Ala	Ala	Ser	Val	Thr	Pro	Ala	Ala	Ala	Ser		

		355					360					365				
Gly	Val	Pro	Gly	Ala	Arg	Ala	Ala	Ala	Ala	Ala	Pro	Ser	Gly	Thr	Ala	
	370					375					380					
Val	Gly	Ala	Gly	Ala	Arg	Ser	Ser	Val	Gly	Thr	Ala	Ala	Ala	Ser	Gly	
385					390					395					400	
Ala	Gly	Ser	His	Ala	Ala	Thr	Gly	Arg	Ala	Pro	Val	Ala	Thr	Ser	Asp	
				405					410					415		
Lys	Ala	Ala	Ala	Pro	Ser	Thr	Arg	Ala	Ala	Ser	Ala	Arg	Thr	Ala	Pro	
			420				425						430			
Pro	Ala	Arg	Pro	Pro	Ser	Thr	Asp	His	Ile	Asp	Lys	Pro	Asp	Arg	Ser	
		435					440					445				
Glu	Ser	Ala	Asp	Asp	Gly	Thr	Pro	Val	Ser	Met	Ile	Pro	Val	Ser	Ala	
	450					455					460					
Ala	Arg	Ala	Ala	Arg	Asp	Ala	Ala	Thr	Ala	Ala	Ala	Ser	Ala	Arg	Gln	
465					470					475					480	
Arg	Gly	Arg	Gly	Asp	Ala	Leu	Arg	Leu	Ala	Arg	Arg	Ile	Ala	Ala	Ala	
				485					490					495		
Leu	Asn	Ala	Ser	Asp	Asn	Asn	Ala	Gly	Asp	Tyr	Gly	Phe	Phe	Trp	Ile	
		500						505					510			
Thr	Ala	Val	Thr	Thr	Asp	Gly	Ser	Ile	Val	Val	Ala	Asn	Ser	Tyr	Gly	
		515					520					525				
Leu	Ala	Tyr	Ile	Pro	Asp	Gly	Met	Glu	Leu	Pro	Asn	Lys	Val	Tyr	Leu	
	530					535					540					
Ala	Ser	Ala	Asp	His	Ala	Ile	Pro	Val	Asp	Glu	Ile	Ala	Arg	Cys	Ala	
545					550					555					560	
Thr	Tyr	Pro	Val	Leu	Ala	Val	Gln	Ala	Trp	Ala	Ala	Phe	His	Asp	Met	
				565					570					575		
Thr	Leu	Arg	Ala	Val	Ile	Gly	Thr	Ala	Glu	Gln	Leu	Ala	Ser	Ser	Asp	
			580					585					590			
Pro	Gly	Val	Ala	Lys	Ile	Val	Leu	Glu	Pro	Asp	Asp	Ile	Pro	Glu	Ser	
		595					600					605				
Gly	Lys	Met	Thr	Gly	Arg	Ser	Arg	Leu	Glu	Val	Val	Asp	Pro	Ser	Ala	
	610					615					620					
Ala	Ala	Gln	Leu	Ala	Asp	Thr	Thr	Asp	Gln	Arg	Leu	Leu	Asp	Leu	Leu	
625					630					635					640	
Pro	Pro	Ala	Pro	Val	Asp	Val	Asn	Pro	Pro	Gly	Asp	Glu	Arg	His	Met	
				645					650					655		
Leu	Trp	Phe	Glu	Leu	Met	Lys	Pro	Met	Thr	Ser	Thr	Ala	Thr	Gly	Arg	
			660					665					670			
Glu	Ala	Ala	His	Leu	Arg	Ala	Phe	Arg	Ala	Tyr	Ala	Ala	His	Ser	Gln	
		675					680					685				
Glu	Ile	Ala	Leu	His	Gln	Ala	His	Thr	Ala	Thr	Asp	Ala	Ala	Val	Gln	
	690					695					700					
Arg	Val	Ala	Val	Ala	Asp	Trp	Leu	Tyr	Trp	Gln	Tyr	Val	Thr	Gly	Leu	
705		</														

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<210> 9
<211> 1776
<212> DNA
<213> Mycobacterium tuberculosis
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<220>  
<221> CDS  
<222> (1) ... (1773)
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<400> 9
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 Met Thr Ala Glu Pro Glu Val Arg Thr Leu Arg Glu Val Val Leu Asp
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cag ctc ggc act gct gaa tcg cgt gcg tac aag atg tgg ctg ccg ccg 96
 Gln Leu Gly Thr Ala Glu Ser Arg Ala Tyr Lys Met Trp Leu Pro Pro
 20 25 30

ttg acc aat ccg gtc ccg ctc aac gag ctc atc gcc cgt gat cgg cga 144
 Leu Thr Asn Pro Val Pro Leu Asn Glu Leu Ile Ala Arg Asp Arg Arg
 35 40 45

caa ccc ctg cga ttt gcc ctg ggg atc atg gat gaa ccg cgc cgc cat 192
 Gln Pro Leu Arg Phe Ala Leu Gly Ile Met Asp Glu Pro Arg Arg His
 50 55 60

cta cag gat gtg tgg ggc gta gac gtt tcc ggg gcc ggc ggc aac atc 240
 Leu Gln Asp Val Trp Gly Val Asp Val Ser Gly Ala Gly Gly Asn Ile
 65 70 75 80

ggt att ggg ggc gca cct caa acc ggg aag tcg acg cta ctg cag acg 288
 Gly Ile Gly Gly Ala Pro Gln Thr Gly Lys Ser Thr Leu Leu Gln Thr
 85 90 95

atg gtg atg tcg gcc gcc gcc aca cac tca ccg cgc aac gtt cag ttc 336
 Met Val Met Ser Ala Ala Ala Thr His Ser Pro Arg Asn Val Gln Phe
 100 105 110

tat tgc atc gac cta ggt ggc ggc ggg ctg atc tat ctc gaa aac ctt 384
 Tyr Cys Ile Asp Leu Gly Gly Gly Leu Ile Tyr Leu Glu Asn Leu
 115 120 125

cca cac gtc ggt ggg gta gcc aat cgg tcc gag ccc gac aag gtc aac 432
 Pro His Val Gly Gly Val Ala Asn Arg Ser Glu Pro Asp Lys Val Asn
 130 135 140

cgg gtg gtc gca gag atg caa gcc gtc atg cgg caa cgg gaa acc acc 480
 Arg Val Val Ala Glu Met Gln Ala Val Met Arg Gln Arg Glu Thr Thr
 145 150 155 160

ttc aag gaa cac cga gtg ggc tcg atc ggg atg tac cgg cag ctg cgt 528
 Phe Lys Glu His Arg Val Gly Ser Ile Gly Met Tyr Arg Gln Leu Arg
 165 170 175

gac gat cca agt caa ccc gtt gcg tcc gat cca tac ggc gac gtc ttt 576
 Asp Asp Pro Ser Gln Pro Val Ala Ser Asp Pro Tyr Gly Asp Val Phe
 180 185 190

ctg atc atc gac gga tgg ccc ggt ttt gtc ggc gag ttc ccc gac ctt 624
 Leu Ile Ile Asp Gly Trp Pro Gly Phe Val Gly Glu Phe Pro Asp Leu
 195 200 205

gag ggg cag gtt caa gat ctg gcc gcc cag ggg ctg gcg ttc ggc gtc 672
 Glu Gly Gln Val Gln Asp Leu Ala Ala Gln Gly Leu Ala Phe Gly Val
 210 215 220

cac gtc atc atc tcc acg cca cgc tgg aca gag ctg aag tcg cgt gtt His Val Ile Ile Ser Thr Pro Arg Trp Thr Glu Leu Lys Ser Arg Val 225 230 235 240	720
cgc gac tac ctc ggc acc aag atc gag ttc cgg ctt ggt gac gtc aat Arg Asp Tyr Leu Gly Thr Lys Ile Glu Phe Arg Leu Gly Asp Val Asn 245 250 255	768
gaa acc cag atc gac cgg att acc cgc gag atc ccg gcg aat cgt ccg Glu Thr Gln Ile Asp Arg Ile Thr Arg Glu Ile Pro Ala Asn Arg Pro 260 265 270	816
ggt cgg gca gtg tcg atg gaa aag cac cat ctg atg atc ggc gtg ccc Gly Arg Ala Val Ser Met Glu Lys His His Leu Met Ile Gly Val Pro 275 280 285	864
agg ttc gac ggc gtg cac agc gcc gat aac ctg gtg gag gcg atc acc Arg Phe Asp Gly Val His Ser Ala Asp Asn Leu Val Glu Ala Ile Thr 290 295 300	912
gcg ggg gtg acg cag atc gct tcc cag cac acc gaa cag gca cct ccg Ala Gly Val Thr Gln Ile Ala Ser Gln His Thr Glu Gln Ala Pro Pro 305 310 315 320	960
gtg cgg gtc ctg ccg gag cgt atc cac ctg cac gaa ctc gac ccg aac Val Arg Val Leu Pro Glu Arg Ile His Leu His Glu Leu Asp Pro Asn 325 330 335	1008
ccg ccg gga cca gag tcc gac tac cgc act cgc tgg gag att ccg atc Pro Pro Gly Pro Glu Ser Asp Tyr Arg Thr Arg Trp Glu Ile Pro Ile 340 345 350	1056
ggc ttg cgc gag acg gac ctg acg ccg gct cac tgc cac atg cac acg Gly Leu Arg Glu Thr Asp Leu Thr Pro Ala His Cys His Met His Thr 355 360 365	1104
aac ccg cac cta ctg atc ttc ggt gcg gcc aaa tcg ggc aag acg acc Asn Pro His Leu Leu Ile Phe Gly Ala Ala Lys Ser Gly Lys Thr Thr 370 375 380	1152
att gcc cac gcg atc gcg cgc gcc att tgt gcc cga aac agt ccc cag Ile Ala His Ala Ile Ala Arg Ala Ile Cys Ala Arg Asn Ser Pro Gln 385 390 395 400	1200
cag gtg cgg ttc atg ctc gcg gac tac cgc tcg ggc ctg ctg gac gcg Gln Val Arg Phe Met Leu Ala Asp Tyr Arg Ser Gly Leu Leu Asp Ala 405 410 415	1248
gtg ccg gac acc cat ctg ctg ggc gcc ggc gcg atc aac cgc aac agc Val Pro Asp Thr His Leu Leu Gly Ala Gly Ala Ile Asn Arg Asn Ser 420 425 430	1296
gcg tcg cta gac gag gcc gtt caa gca ctg gcg gtc aac ctg aag aag Ala Ser Leu Asp Glu Ala Val Gln Ala Leu Ala Val Asn Leu Lys Lys 435 440 445	1344
cgg ttg ccg ccg acc gac ctg acg acg gcg cag cta cgc tcg cgt tcg	1392

Arg	Leu	Pro	Pro	Thr	Asp	Leu	Thr	Thr	Ala	Gln	Leu	Arg	Ser	Arg	Ser		
450						455					460						
tgg	tgg	agc	gga	ttt	gac	gtc	gtg	ctt	ctg	gtc	gac	gat	tgg	cac	atg	1440	
Trp	Trp	Ser	Gly	Phe	Asp	Val	Val	Leu	Leu	Val	Asp	Asp	Trp	His	Met		
465					470					475					480		
atc	gtg	ggt	gcc	gcc	ggg	ggg	atg	ccg	ccg	atg	gca	ccg	ctg	gcc	ccg	1488	
Ile	Val	Gly	Ala	Ala	Gly	Gly	Met	Pro	Pro	Met	Ala	Pro	Leu	Ala	Pro		
				485					490					495			
tta	ttg	ccg	gcg	gcg	gca	gat	atc	ggg	ttg	cac	atc	att	gtc	acc	tgt	1536	
Leu	Leu	Pro	Ala	Ala	Ala	Asp	Ile	Gly	Leu	His	Ile	Ile	Val	Thr	Cys		
			500					505					510				
cag	atg	agc	cag	gct	tac	aag	gca	acc	atg	gac	aag	ttc	gtc	ggc	gcc	1584	
Gln	Met	Ser	Gln	Ala	Tyr	Lys	Ala	Thr	Met	Asp	Lys	Phe	Val	Gly	Ala		
		515					520					525					
gca	ttc	ggg	tcg	ggc	gct	ccg	aca	atg	ttc	ctt	tcg	ggc	gag	aag	cag	1632	
Ala	Phe	Gly	Ser	Gly	Ala	Pro	Thr	Met	Phe	Leu	Ser	Gly	Glu	Lys	Gln		
	530					535					540						
gaa	ttc	cca	tcc	agt	gag	ttc	aag	gtc	aag	cgg	cgc	ccc	cct	ggc	cag	1680	
Glu	Phe	Pro	Ser	Ser	Glu	Phe	Lys	Val	Lys	Arg	Arg	Pro	Pro	Gly	Gln		
545					550					555					560		
gca	ttt	ctc	gtc	tcg	cca	gac	ggc	aaa	gag	gtc	atc	cag	gcc	ccc	tac	1728	
Ala	Phe	Leu	Val	Ser	Pro	Asp	Gly	Lys	Glu	Val	Ile	Gln	Ala	Pro	Tyr		
				565					570					575			
atc	gag	cct	cca	gaa	gaa	gtg	ttc	gca	gca	ccc	cca	agc	gcc	ggt		1773	
Ile	Glu	Pro	Pro	Glu	Glu	Val	Phe	Ala	Ala	Pro	Pro	Ser	Ala	Gly			
			580					585					590				
taa																1776	
<210> 10																	
<211> 300																	
<212> DNA																	
<213> Mycobacterium tuberculosis																	
<220>																	
<221> CDS																	
<222> (1)...(297)																	
<400> 10																	
atg	gaa	aaa	atg	tca	cat	gat	ccg	atc	gct	gcc	gac	att	ggc	acg	caa	48	
Met	Glu	Lys	Met	Ser	His	Asp	Pro	Ile	Ala	Ala	Asp	Ile	Gly	Thr	Gln		
1				5				10					15				
gtg	agc	gac	aac	gct	ctg	cac	ggc	gtg	acg	gcc	ggc	tcg	acg	gcg	ctg	96	
Val	Ser	Asp	Asn	Ala	Leu	His	Gly	Val	Thr	Ala	Gly	Ser	Thr	Ala	Leu		
			20					25				30					
acg	tcg	gtg	acc	ggg	ctg	gtt	ccc	gcg	ggg	gcc	gat	gag	gtc	tcc	gcc	144	
Thr	Ser	Val	Thr	Gly	Leu	Val	Pro	Ala	Gly	Ala	Asp	Glu	Val	Ser	Ala		

35	40	45	
caa gcg gcg acg gcg ttc aca tcg gag ggc atc caa ttg ctg gct tcc			192
Gln Ala Ala Thr Ala Phe Thr Ser Glu Gly Ile Gln Leu Leu Ala Ser			
50	55	60	
aat gca tcg gcc caa gac cag ctc cac cgt gcg ggc gaa gcg gtc cag			240
Asn Ala Ser Ala Gln Asp Gln Leu His Arg Ala Gly Glu Ala Val Gln			
65	70	75	80
gac gtc gcc cgc acc tat tcg caa atc gac gac ggc gcc gcc ggc gtc			288
Asp Val Ala Arg Thr Tyr Ser Gln Ile Asp Asp Gly Ala Ala Gly Val			
	85	90	95
ttc gcc gaa tag			300
Phe Ala Glu			

<210> 11
 <211> 1107
 <212> DNA
 <213> Mycobacterium tuberculosis

<220>
 <221> CDS
 <222> (1)...(1104)

<400> 11	
atg ctg tgg cac gca atg cca ccg gag cta aat acc gca cgg ctg atg	48
Met Leu Trp His Ala Met Pro Pro Glu Leu Asn Thr Ala Arg Leu Met	
1	5
gcc ggc gcg ggt ccg gct cca atg ctt gcg gcg gcc gcg gga tgg cag	96
Ala Gly Ala Gly Pro Ala Pro Met Leu Ala Ala Ala Ala Gly Trp Gln	
	20
acg ctt tcg gcg gct ctg gac gct cag gcc gtc gag ttg acc gcg cgc	144
Thr Leu Ser Ala Ala Leu Asp Ala Gln Ala Val Glu Leu Thr Ala Arg	
	35
ctg aac tct ctg gga gaa gcc tgg act gga ggt ggc agc gac aag gcg	192
Leu Asn Ser Leu Gly Glu Ala Trp Thr Gly Gly Gly Ser Asp Lys Ala	
	50
ctt gcg gct gca acg ccg atg gtg gtc tgg cta caa acc gcg tca aca	240
Leu Ala Ala Ala Thr Pro Met Val Val Trp Leu Gln Thr Ala Ser Thr	
	65
cag gcc aag acc cgt gcg atg cag gcg acg gcg caa gcc gcg gca tac	288
Gln Ala Lys Thr Arg Ala Met Gln Ala Thr Ala Gln Ala Ala Ala Tyr	
	85
acc cag gcc atg gcc acg acg ccg tcg ctg ccg gag atc gcc gcc aac	336
Thr Gln Ala Met Ala Thr Thr Pro Ser Leu Pro Glu Ile Ala Ala Asn	
	100

cac atc acc cag gcc gtc ctt acg gcc acc aac ttc ttc ggt atc aac His Ile Thr Gln Ala Val Leu Thr Ala Thr Asn Phe Phe Gly Ile Asn 115 120 125	384
acg atc ccg atc gcg ttg acc gag atg gat tat ttc atc cgt atg tgg Thr Ile Pro Ile Ala Leu Thr Glu Met Asp Tyr Phe Ile Arg Met Trp 130 135 140	432
aac cag gca gcc ctg gca atg gag gtc tac cag gcc gag acc gcg gtt Asn Gln Ala Ala Leu Ala Met Glu Val Tyr Gln Ala Glu Thr Ala Val 145 150 155 160	480
aac acg ctt ttc gag aag ctc gag ccg atg gcg tcg atc ctt gat ccc Asn Thr Leu Phe Glu Lys Leu Glu Pro Met Ala Ser Ile Leu Asp Pro 165 170 175	528
ggc gcg agc cag agc acg acg aac ccg atc ttc gga atg ccc tcc cct Gly Ala Ser Gln Ser Thr Thr Asn Pro Ile Phe Gly Met Pro Ser Pro 180 185 190	576
ggc agc tca aca ccg gtt ggc cag ttg ccg ccg gcg gct acc cag acc Gly Ser Ser Thr Pro Val Gly Gln Leu Pro Pro Ala Ala Thr Gln Thr 195 200 205	624
ctc ggc caa ctg ggt gag atg agc ggc ccg atg cag cag ctg acc cag Leu Gly Gln Leu Gly Glu Met Ser Gly Pro Met Gln Gln Leu Thr Gln 210 215 220	672
ccg ctg cag cag gtg acg tcg ttg ttc agc cag gtg ggc ggc acc ggc Pro Leu Gln Gln Val Thr Ser Leu Phe Ser Gln Val Gly Gly Thr Gly 225 230 235 240	720
ggc ggc aac cca gcc gac gag gaa gcc gcg cag atg ggc ctg ctc ggc Gly Gly Asn Pro Ala Asp Glu Glu Ala Ala Gln Met Gly Leu Leu Gly 245 250 255	768
acc agt ccg ctg tcg aac cat ccg ctg gct ggt gga tca ggc ccc agc Thr Ser Pro Leu Ser Asn His Pro Leu Ala Gly Gly Ser Gly Pro Ser 260 265 270	816
gcg ggc gcg ggc ctg ctg cgc gcg gag tcg cta cct ggc gca ggt ggg Ala Gly Ala Gly Leu Leu Arg Ala Glu Ser Leu Pro Gly Ala Gly Gly 275 280 285	864
tcg ttg acc cgc acg ccg ctg atg tct cag ctg atc gaa aag ccg gtt Ser Leu Thr Arg Thr Pro Leu Met Ser Gln Leu Ile Glu Lys Pro Val 290 295 300	912
gcc ccc tcg gtg atg ccg gcg gct gct gcc gga tcg tcg gcg acg ggt Ala Pro Ser Val Met Pro Ala Ala Ala Ala Gly Ser Ser Ala Thr Gly 305 310 315 320	960
ggc gcc gct ccg gtg ggt gcg gga gcg atg ggc cag ggt gcg caa tcc Gly Ala Ala Pro Val Gly Ala Gly Ala Met Gly Gln Gly Ala Gln Ser 325 330 335	1008
ggc ggc tcc acc agg ccg ggt ctg gtc gcg ccg gca ccg ctc gcg cag	1056

Gly Gly Ser Thr Arg Pro Gly Leu Val Ala Pro Ala Pro Leu Ala Gln
 340 345 350

gag cgt gaa gaa gac gac gag gac gac tgg gac gaa gag gac gac tgg 1104
 Glu Arg Glu Glu Asp Asp Glu Asp Asp Trp Asp Glu Glu Asp Asp Trp
 355 360 365

tga 1107

<210> 12
 <211> 303
 <212> DNA
 <213> Mycobacterium tuberculosis

<220>
 <221> CDS
 <222> (1)...(300)

<400> 12
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aat ttc gag cgg atc tcc ggc gac ctg aaa acc cag atc gac cag gtg 96
 Asn Phe Glu Arg Ile Ser Gly Asp Leu Lys Thr Gln Ile Asp Gln Val
 20 25 30

gag tcg acg gca ggt tcg ttg cag ggc cag tgg cgc ggc gcg gcg ggg 144
 Glu Ser Thr Ala Gly Ser Leu Gln Gly Gln Trp Arg Gly Ala Ala Gly
 35 40 45

acg gcc gcc cag gcc gcg gtg gtg cgc ttc caa gaa gca gcc aat aag 192
 Thr Ala Ala Gln Ala Ala Val Val Arg Phe Gln Glu Ala Ala Asn Lys
 50 55 60

cag aag cag gaa ctc gac gag atc tcg acg aat att cgt cag gcc ggc 240
 Gln Lys Gln Glu Leu Asp Glu Ile Ser Thr Asn Ile Arg Gln Ala Gly
 65 70 75 80

gtc caa tac tcg agg gcc gac gag gag cag cag cag gcg ctg tcc tcg 288
 Val Gln Tyr Ser Arg Ala Asp Glu Glu Gln Gln Gln Ala Leu Ser Ser
 85 90 95

caa atg ggc ttc tga 303
 Gln Met Gly Phe
 100

<210> 13
 <211> 2001
 <212> DNA
 <213> Mycobacterium tuberculosis

<220>
 <221> CDS
 <222> (1)...(1998)

<400> 13

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Met Ala Ala Asp Tyr Asp Lys Leu Phe Arg Pro His Glu Gly Met Glu	
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gct ccg gac gat atg gca gcg cag ccg ttc ttc gac ccc agt gct tcg	96
Ala Pro Asp Asp Met Ala Ala Gln Pro Phe Phe Asp Pro Ser Ala Ser	
20 25 30	
ttt ccg ccg gcg ccc gca tcg gca aac cta ccg aag ccc aac ggc cag	144
Phe Pro Pro Ala Pro Ala Ser Ala Asn Leu Pro Lys Pro Asn Gly Gln	
35 40 45	
act ccg ccc ccg acg tcc gac gac ctg tcg gag ccg ttc gtg tcg gcc	192
Thr Pro Pro Pro Thr Ser Asp Asp Leu Ser Glu Arg Phe Val Ser Ala	
50 55 60	
ccg ccg ccg cca ccc cca ccc cca cct ccg cct ccg cca act ccg atg	240
Pro Pro Pro Pro Pro Pro Pro Pro Pro Pro Pro Pro Pro Thr Pro Met	
65 70 75 80	
ccg atc gcc gca gga gag ccg ccc tcg ccg gaa ccg gcc gca tct aaa	288
Pro Ile Ala Ala Gly Glu Pro Pro Ser Pro Glu Pro Ala Ala Ser Lys	
85 90 95	
cca ccc aca ccc ccc atg ccc atc gcc gga ccc gaa ccg gcc cca ccc	336
Pro Pro Thr Pro Pro Met Pro Ile Ala Gly Pro Glu Pro Ala Pro Pro	
100 105 110	
aaa cca ccc aca ccc ccc atg ccc atc gcc gga ccc gaa ccg gcc cca	384
Lys Pro Pro Thr Pro Pro Met Pro Ile Ala Gly Pro Glu Pro Ala Pro	
115 120 125	
ccc aaa cca ccc aca cct ccg atg ccc atc gcc gga cct gca ccc acc	432
Pro Lys Pro Pro Thr Pro Pro Met Pro Ile Ala Gly Pro Ala Pro Thr	
130 135 140	
cca acc gaa tcc cag ttg gcg ccc ccc aga cca ccg aca cca caa acg	480
Pro Thr Glu Ser Gln Leu Ala Pro Pro Arg Pro Pro Thr Pro Gln Thr	
145 150 155 160	
cca acc gga gcg ccg cag caa ccg gaa tca ccg gcg ccc cac gta ccc	528
Pro Thr Gly Ala Pro Gln Gln Pro Glu Ser Pro Ala Pro His Val Pro	
165 170 175	
tcg cac ggg cca cat caa ccc cgg cgc acc gca cca gca ccg ccc tgg	576
Ser His Gly Pro His Gln Pro Arg Arg Thr Ala Pro Ala Pro Pro Trp	
180 185 190	
gca aag atg cca atc ggc gaa ccc ccg ccc gct ccg tcc aga ccg tct	624
Ala Lys Met Pro Ile Gly Glu Pro Pro Pro Ala Pro Ser Arg Pro Ser	
195 200 205	
gcg tcc ccg gcc gaa cca ccg acc cgg cct gcc ccc caa cac tcc cga	672
Ala Ser Pro Ala Glu Pro Pro Thr Arg Pro Ala Pro Gln His Ser Arg	
210 215 220	

cgt gcg cgc cgg ggt cac cgc tat cgc aca gac acc gaa cga aac gtc Arg Ala Arg Arg Gly His Arg Tyr Arg Thr Asp Thr Glu Arg Asn Val 225 230 235 240	720
ggg aag gta gca act ggt cca tcc atc cag gcg cgg ctg cgg gca gag Gly Lys Val Ala Thr Gly Pro Ser Ile Gln Ala Arg Leu Arg Ala Glu 245 250 255	768
gaa gca tcc ggc gcg cag ctc gcc ccc gga acg gag ccc tcg cca gcg Glu Ala Ser Gly Ala Gln Leu Ala Pro Gly Thr Glu Pro Ser Pro Ala 260 265 270	816
ccg ttg ggc caa ccg aga tcg tat ctg gct ccg ccc acc cgc ccc gcg Pro Leu Gly Gln Pro Arg Ser Tyr Leu Ala Pro Pro Thr Arg Pro Ala 275 280 285	864
ccg aca gaa cct ccc ccc agc ccc tcg ccg cag cgc aac tcc ggt cgg Pro Thr Glu Pro Pro Pro Ser Pro Ser Pro Gln Arg Asn Ser Gly Arg 290 295 300	912
cgt gcc gag cga cgc gtc cac ccc gat tta gcc gcc caa cat gcc gcg Arg Ala Glu Arg Arg Val His Pro Asp Leu Ala Ala Gln His Ala Ala 305 310 315 320	960
gcg caa cct gat tca att acg gcc gca acc act ggc ggt cgt cgc cgc Ala Gln Pro Asp Ser Ile Thr Ala Ala Thr Thr Gly Gly Arg Arg Arg 325 330 335	1008
aag cgt gca gcg ccg gat ctc gac gcg aca cag aaa tcc tta agg ccg Lys Arg Ala Ala Pro Asp Leu Asp Ala Thr Gln Lys Ser Leu Arg Pro 340 345 350	1056
gcg gcc aag ggg ccg aag gtg aag aag gtg aag ccc cag aaa ccg aag Ala Ala Lys Gly Pro Lys Val Lys Lys Val Lys Pro Gln Lys Pro Lys 355 360 365	1104
gcc acg aag ccg ccc aaa gtg gtg tcg cag cgc ggc tgg cga cat tgg Ala Thr Lys Pro Pro Lys Val Val Ser Gln Arg Gly Trp Arg His Trp 370 375 380	1152
gtg cat gcg ttg acg cga atc aac ctg ggc ctg tca ccc gac gag aag Val His Ala Leu Thr Arg Ile Asn Leu Gly Leu Ser Pro Asp Glu Lys 385 390 395 400	1200
tac gag ctg gac ctg cac gct cga gtc cgc cgc aat ccc cgc ggg tcg Tyr Glu Leu Asp Leu His Ala Arg Val Arg Arg Asn Pro Arg Gly Ser 405 410 415	1248
tat cag atc gcc gtc gtc ggt ctc aaa ggt ggg gct ggc aaa acc acg Tyr Gln Ile Ala Val Val Gly Leu Lys Gly Gly Ala Gly Lys Thr Thr 420 425 430	1296
ctg aca gca gcg ttg ggg tcg acg ttg gct cag gtg cgg gcc gac cgg Leu Thr Ala Ala Leu Gly Ser Thr Leu Ala Gln Val Arg Ala Asp Arg 435 440 445	1344
atc ctg gct cta gac gcg gat cca ggc gcc gga aac ctc gcc gat cgg	1392

Ile	Leu	Ala	Leu	Asp	Ala	Asp	Pro	Gly	Ala	Gly	Asn	Leu	Ala	Asp	Arg		
450						455					460						
gta	ggg	cga	caa	tcg	ggc	gcg	acc	atc	gct	gat	gtg	ctt	gca	gaa	aaa	1440	
Val	Gly	Arg	Gln	Ser	Gly	Ala	Thr	Ile	Ala	Asp	Val	Leu	Ala	Glu	Lys		
465					470					475					480		
gag	ctg	tcg	cac	tac	aac	gac	atc	cgc	gca	cac	act	agc	gtc	aat	gcg	1488	
Glu	Leu	Ser	His	Tyr	Asn	Asp	Ile	Arg	Ala	His	Thr	Ser	Val	Asn	Ala		
				485					490					495			
gtc	aat	ctg	gaa	gtg	ctg	ccg	gca	ccg	gaa	tac	agc	tcg	gcg	cag	cg	1536	
Val	Asn	Leu	Glu	Val	Leu	Pro	Ala	Pro	Glu	Tyr	Ser	Ser	Ala	Gln	Arg		
			500					505					510				
gcg	ctc	agc	gac	gcc	gac	tgg	cat	ttc	atc	gcc	gat	cct	gcg	tcg	agg	1584	
Ala	Leu	Ser	Asp	Ala	Asp	Trp	His	Phe	Ile	Ala	Asp	Pro	Ala	Ser	Arg		
		515				520						525					
ttt	tac	aac	ctc	gtc	ttg	gct	gat	tgt	ggg	gcc	ggc	ttc	ttc	gac	ccg	1632	
Phe	Tyr	Asn	Leu	Val	Leu	Ala	Asp	Cys	Gly	Ala	Gly	Phe	Phe	Asp	Pro		
	530					535					540						
ctg	acc	cgc	ggc	gtg	ctg	tcc	acg	gtg	tcc	ggt	gtc	gtg	gtc	gtg	gca	1680	
Leu	Thr	Arg	Gly	Val	Leu	Ser	Thr	Val	Ser	Gly	Val	Val	Val	Val	Ala		
545					550					555					560		
agt	gtc	tca	atc	gac	ggc	gca	caa	cag	gcg	tcg	gtc	gcg	ttg	gac	tgg	1728	
Ser	Val	Ser	Ile	Asp	Gly	Ala	Gln	Gln	Ala	Ser	Val	Ala	Leu	Asp	Trp		
				565					570					575			
ttg	cgc	aac	aac	ggt	tac	caa	gat	ttg	gcg	agc	cgc	gca	tgc	gtg	gtc	1776	
Leu	Arg	Asn	Asn	Gly	Tyr	Gln	Asp	Leu	Ala	Ser	Arg	Ala	Cys	Val	Val		
			580					585					590				
atc	aat	cac	atc	atg	ccg	gga	gaa	ccc	aat	gtc	gca	gtt	aaa	gac	ctg	1824	
Ile	Asn	His	Ile	Met	Pro	Gly	Glu	Pro	Asn	Val	Ala	Val	Lys	Asp	Leu		
		595				600						605					
gtg	cgg	cat	ttc	gaa	cag	caa	gtt	caa	ccc	ggc	cgg	gtc	gtg	gtc	atg	1872	
Val	Arg	His	Phe	Glu	Gln	Gln	Val	Gln	Pro	Gly	Arg	Val	Val	Val	Met		
	610					615					620						
ccg	tgg	gac	agg	cac	att	gcg	gcc	gga	acc	gag	att	tca	ctc	gac	ttg	1920	
Pro	Trp	Asp	Arg	His	Ile	Ala	Ala	Gly	Thr	Glu	Ile	Ser	Leu	Asp	Leu		
625					630					635					640		
ctc	gac	cct	atc	tac	aag	cgc	aag	gtc	ctc	gaa	ttg	gcc	gca	gcg	cta	1968	
Leu	Asp	Pro	Ile	Tyr	Lys	Arg	Lys	Val	Leu	Glu	Leu	Ala	Ala	Ala	Leu		
				645					650					655			
tcc	gac	gat	ttc	gag	agg	gct	gga	cgt	cgt	tga						2001	
Ser	Asp	Asp	Phe	Glu	Arg	Ala	Gly	Arg	Arg								
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<211> 1536
 <212> DNA
 <213> Mycobacterium tuberculosis

<220>
 <221> CDS
 <222> (1)...(1533)

<400> 14

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Leu Ser Ala Pro Ala Val Ala Ala Gly Pro Thr Ala Ala Gly Ala Thr	
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gct gcg cgg cct gcc acc acc cgg gtg acg atc ctg acc ggc aga cgg	96
Ala Ala Arg Pro Ala Thr Thr Arg Val Thr Ile Leu Thr Gly Arg Arg	
20 25 30	
atg acc gat ttg gta ctg cca gcg gcg gtg ccg atg gaa act tat att	144
Met Thr Asp Leu Val Leu Pro Ala Ala Val Pro Met Glu Thr Tyr Ile	
35 40 45	
gac gac acc gtc gcg gtg ctt tcc gag gtg ttg gaa gac acg ccg gct	192
Asp Asp Thr Val Ala Val Leu Ser Glu Val Leu Glu Asp Thr Pro Ala	
50 55 60	
gat gta ctc ggc ggc ttc gac ttt acc gcg caa ggc gtg tgg gcg ttc	240
Asp Val Leu Gly Gly Phe Asp Phe Thr Ala Gln Gly Val Trp Ala Phe	
65 70 75 80	
gct cgt ccc gga tcg ccg ccg ctg aag ctc gac cag tca ctc gat gac	288
Ala Arg Pro Gly Ser Pro Pro Leu Lys Leu Asp Gln Ser Leu Asp Asp	
85 90 95	
gcc ggg gtg gtc gac ggg tca ctg ctg act ctg gtg tca gtc agt cgc	336
Ala Gly Val Val Asp Gly Ser Leu Leu Thr Leu Val Ser Val Ser Arg	
100 105 110	
acc gag cgc tac cga ccg ttg gtc gag gat gtc atc gac gcg atc gcc	384
Thr Glu Arg Tyr Arg Pro Leu Val Glu Asp Val Ile Asp Ala Ile Ala	
115 120 125	
gtg ctt gac gag tca cct gag ttc gac cgc acg gca ttg aat cgc ttt	432
Val Leu Asp Glu Ser Pro Glu Phe Asp Arg Thr Ala Leu Asn Arg Phe	
130 135 140	
gtg ggg gcg gcg atc ccg ctt ttg acc gcg ccc gtc atc ggg atg gcg	480
Val Gly Ala Ala Ile Pro Leu Leu Thr Ala Pro Val Ile Gly Met Ala	
145 150 155 160	
atg cgg gcg tgg tgg gaa act ggg cgt agc ttg tgg tgg ccg ttg gcg	528
Met Arg Ala Trp Trp Glu Thr Gly Arg Ser Leu Trp Trp Pro Leu Ala	
165 170 175	
att ggc atc ctg ggg atc gct gtg ctg gta ggc agc ttc gtc gcg aac	576
Ile Gly Ile Leu Gly Ile Ala Val Leu Val Gly Ser Phe Val Ala Asn	
180 185 190	

agg ttc tac cag agc ggc cac ctg gcc gag tgc cta ctg gtc acg acg Arg Phe Tyr Gln Ser Gly His Leu Ala Glu Cys Leu Leu Val Thr Thr 195 200 205	624
tat ctg ctg atc gca acc gcc gca gcg ctg gcc gtg ccg ttg ccg cgc Tyr Leu Leu Ile Ala Thr Ala Ala Ala Leu Ala Val Pro Leu Pro Arg 210 215 220	672
ggg gtc aac tcg ttg ggg gcg cca caa gtt gcc ggc gcc gct acg gcc Gly Val Asn Ser Leu Gly Ala Pro Gln Val Ala Gly Ala Ala Thr Ala 225 230 235 240	720
gtg ctg ttt ttg acc ttg atg acg cgg ggc ggc cct cgg aag cgt cat Val Leu Phe Leu Thr Leu Met Thr Arg Gly Gly Pro Arg Lys Arg His 245 250 255	768
gag ttg gcg tcg ttt gcc gtg atc acc gct atc gcg gtc atc gcg gcc Glu Leu Ala Ser Phe Ala Val Ile Thr Ala Ile Ala Val Ile Ala Ala 260 265 270	816
gcc gct gcc ttc ggc tat gga tac cag gac tgg gtc ccc gcg ggg ggg Ala Ala Ala Phe Gly Tyr Gly Tyr Gln Asp Trp Val Pro Ala Gly Gly 275 280 285	864
atc gca ttc ggg ctg ttc att gtg acg aat gcg gcc aag ctg acc gtc Ile Ala Phe Gly Leu Phe Ile Val Thr Asn Ala Ala Lys Leu Thr Val 290 295 300	912
gcg gtc gcg cgg atc gcg ctg ccg ccg att ccg gta ccc ggc gaa acc Ala Val Ala Arg Ile Ala Leu Pro Pro Ile Pro Val Pro Gly Glu Thr 305 310 315 320	960
gtg gac aac gag gag ttg ctc gat ccc gtc gcg acc ccg gag gct acc Val Asp Asn Glu Glu Leu Leu Asp Pro Val Ala Thr Pro Glu Ala Thr 325 330 335	1008
agc gaa gaa acc ccg acc tgg cag gcc atc atc gcg tcg gtg ccc gcg Ser Glu Glu Thr Pro Thr Trp Gln Ala Ile Ile Ala Ser Val Pro Ala 340 345 350	1056
tcc gcg gtc cgg ctc acc gag cgc agc aaa ctg gcc aag caa ctt ctg Ser Ala Val Arg Leu Thr Glu Arg Ser Lys Leu Ala Lys Gln Leu Leu 355 360 365	1104
atc gga tac gtc acg tcg ggc acc ctg att ctg gct gcc ggt gcc atc Ile Gly Tyr Val Thr Ser Gly Thr Leu Ile Leu Ala Ala Gly Ala Ile 370 375 380	1152
gcg gtc gtg gtg cgc ggg cac ttc ttt gta cac agc ctg gtg gtc gcg Ala Val Val Val Arg Gly His Phe Phe Val His Ser Leu Val Val Ala 385 390 395 400	1200
ggg ttg atc acg acc gtc tgc gga ttt cgc tcg cgg ctt tac gcc gag Gly Leu Ile Thr Thr Val Cys Gly Phe Arg Ser Arg Leu Tyr Ala Glu 405 410 415	1248
cgc tgg tgt gcg tgg gcg ttg ctg gcg gcg acg gtc gcg att ccg acg	1296

Arg Trp Cys Ala Trp Ala Leu Leu Ala Ala Thr Val Ala Ile Pro Thr	
420 425 430	
ggt ctg acg gcc aaa ctc atc atc tgg tac ccg cac tat gcc tgg ctg	1344
Gly Leu Thr Ala Lys Leu Ile Ile Trp Tyr Pro His Tyr Ala Trp Leu	
435 440 445	
ttg ttg agc gtc tac ctc acg gta gcc ctg gtt gcg ctc gtg gtg gtc	1392
Leu Leu Ser Val Tyr Leu Thr Val Ala Leu Val Ala Leu Val Val Val	
450 455 460	
ggg tcg atg gct cac gtc cgg cgc gtt tca ccg gtc gta aaa cga act	1440
Gly Ser Met Ala His Val Arg Arg Val Ser Pro Val Val Lys Arg Thr	
465 470 475 480	
ctg gaa ttg atc gac ggc gcc atg atc gct gcc atc att ccc atg ctg	1488
Leu Glu Leu Ile Asp Gly Ala Met Ile Ala Ala Ile Ile Pro Met Leu	
485 490 495	
ctg tgg atc acc ggg gtg tac gac acg gtc cgc aat atc cgg ttc	1533
Leu Trp Ile Thr Gly Val Tyr Asp Thr Val Arg Asn Ile Arg Phe	
500 505 510	
tga	1536
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Met Ala Glu Pro Leu Ala Val Asp Pro Thr Gly Leu Ser Ala Ala Ala	
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gcg aaa ttg gcc ggc ctc gtt ttt ccg cag cct ccg gcg ccg atc gcg	96
Ala Lys Leu Ala Gly Leu Val Phe Pro Gln Pro Pro Ala Pro Ile Ala	
20 25 30	
gtc agc gga acg gat tcg gtg gta gca gca atc aac gag acc atg cca	144
Val Ser Gly Thr Asp Ser Val Val Ala Ala Ile Asn Glu Thr Met Pro	
35 40 45	
agc atc gaa tcg ctg gtc agt gac ggg ctg ccc ggc gtg aaa gcc gcc	192
Ser Ile Glu Ser Leu Val Ser Asp Gly Leu Pro Gly Val Lys Ala Ala	
50 55 60	
ctg act cga aca gca tcc aac atg aac gcg gcg gcg gac gtc tat gcg	240
Leu Thr Arg Thr Ala Ser Asn Met Asn Ala Ala Ala Asp Val Tyr Ala	
65 70 75 80	
aag acc gat cag tca ctg gga acc agt ttg agc cag tat gca ttc ggc	288
Lys Thr Asp Gln Ser Leu Gly Thr Ser Leu Ser Gln Tyr Ala Phe Gly	

85								90				95				
tcg	tcg	ggc	gaa	ggc	ctg	gct	ggc	gtc	gcc	tcg	gtc	ggt	ggt	cag	cca	336
Ser	Ser	Gly	Glu	Gly	Leu	Ala	Gly	Val	Ala	Ser	Val	Gly	Gly	Gln	Pro	
			100					105					110			
agt	cag	gct	acc	cag	ctg	ctg	agc	aca	ccc	gtg	tca	cag	gtc	acg	acc	384
Ser	Gln	Ala	Thr	Gln	Leu	Leu	Ser	Thr	Pro	Val	Ser	Gln	Val	Thr	Thr	
			115				120						125			
cag	ctc	ggc	gag	acg	gcc	gct	gag	ctg	gca	ccc	cgt	gtt	gtt	gcg	acg	432
Gln	Leu	Gly	Glu	Thr	Ala	Ala	Glu	Leu	Ala	Pro	Arg	Val	Val	Ala	Thr	
			130				135					140				
gtg	ccg	caa	ctc	gtt	cag	ctg	gct	ccg	cac	gcc	gtt	cag	atg	tcg	caa	480
Val	Pro	Gln	Leu	Val	Gln	Leu	Ala	Pro	His	Ala	Val	Gln	Met	Ser	Gln	
						150				155					160	
aac	gca	tcc	ccc	atc	gct	cag	acg	atc	agt	caa	acc	gcc	caa	cag	gcc	528
Asn	Ala	Ser	Pro	Ile	Ala	Gln	Thr	Ile	Ser	Gln	Thr	Ala	Gln	Gln	Ala	
				165				170						175		
gcc	cag	agc	gcg	cag	ggc	ggc	agc	ggc	cca	atg	ccc	gca	cag	ctt	gcc	576
Ala	Gln	Ser	Ala	Gln	Gly	Gly	Ser	Gly	Pro	Met	Pro	Ala	Gln	Leu	Ala	
			180					185					190			
agc	gct	gaa	aaa	ccg	gcc	acc	gag	caa	gcg	gag	ccg	gtc	cac	gaa	gtg	624
Ser	Ala	Glu	Lys	Pro	Ala	Thr	Glu	Gln	Ala	Glu	Pro	Val	His	Glu	Val	
			195				200					205				
aca	aac	gac	gat	cag	ggc	gac	cag	ggc	gac	gtg	cag	ccg	gcc	gag	gtc	672
Thr	Asn	Asp	Asp	Gln	Gly	Asp	Gln	Gly	Asp	Val	Gln	Pro	Ala	Glu	Val	
			210				215					220				
gtt	gcc	gcg	gca	cgt	gac	gaa	ggc	gcc	ggc	gca	tca	ccg	ggc	cag	cag	720
Val	Ala	Ala	Ala	Arg	Asp	Glu	Gly	Ala	Gly	Ala	Ser	Pro	Gly	Gln	Gln	
						230				235					240	
ccc	ggc	ggg	ggc	gtt	ccc	gcg	caa	gcc	atg	gat	acc	gga	gcc	ggt	gcc	768
Pro	Gly	Gly	Gly	Val	Pro	Ala	Gln	Ala	Met	Asp	Thr	Gly	Ala	Gly	Ala	
				245					250					255		
cgc	cca	gcg	gcg	agt	ccg	ctg	gcg	gcc	ccc	gtc	gat	ccg	tcg	act	ccg	816
Arg	Pro	Ala	Ala	Ser	Pro	Leu	Ala	Ala	Pro	Val	Asp	Pro	Ser	Thr	Pro	
				260				265					270			
gca	ccc	tca	aca	acc	aca	acg	ttg	tag								843
Ala	Pro	Ser	Thr	Thr	Thr	Thr	Leu									
			275				280									

<210> 16

<211> 2190

<212> DNA

<213> Mycobacterium tuberculosis

<220>

<221> CDS

<222> (1)...(2187)

<400> 16

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ccg ggc ggc tgg gtg gaa gcc gat gaa gac act ttc tat gac cgg gcc	96
Pro Gly Gly Trp Val Glu Ala Asp Glu Asp Thr Phe Tyr Asp Arg Ala	
20 25 30	
cag gaa tat agc cag gtt ttg caa agg gtc acc gat gta ttg gac acc	144
Gln Glu Tyr Ser Gln Val Leu Gln Arg Val Thr Asp Val Leu Asp Thr	
35 40 45	
tgc cgc cag cag aaa ggc cac gtc ttc gaa ggc ggc cta tgg tcc ggc	192
Cys Arg Gln Gln Lys Gly His Val Phe Glu Gly Gly Leu Trp Ser Gly	
50 55 60	
ggc gcc gcc aat gct gcc aac ggc gcc ctg ggt gca aac atc aat caa	240
Gly Ala Ala Asn Ala Ala Asn Gly Ala Leu Gly Ala Asn Ile Asn Gln	
65 70 75 80	
ttg atg acg ctg cag gat tat ctc gcc acg gtg att acc tgg cac agg	288
Leu Met Thr Leu Gln Asp Tyr Leu Ala Thr Val Ile Thr Trp His Arg	
85 90 95	
cat att gcc ggg ttg att gag caa gct aaa tcc gat atc ggc aat aat	336
His Ile Ala Gly Leu Ile Glu Gln Ala Lys Ser Asp Ile Gly Asn Asn	
100 105 110	
gtg gat ggc gct caa cgg gag atc gat atc ctg gag aat gac cct agc	384
Val Asp Gly Ala Gln Arg Glu Ile Asp Ile Leu Glu Asn Asp Pro Ser	
115 120 125	
ctg gat gct gat gag cgc cat acc gcc atc aat tca ttg gtc acg gcg	432
Leu Asp Ala Asp Glu Arg His Thr Ala Ile Asn Ser Leu Val Thr Ala	
130 135 140	
acg cat ggg gcc aat gtc agt ctg gtc gcc gag acc gct gag cgg gtg	480
Thr His Gly Ala Asn Val Ser Leu Val Ala Glu Thr Ala Glu Arg Val	
145 150 155 160	
ctg gaa tcc aag aat tgg aaa cct ccg aag aac gca ctc gag gat ttg	528
Leu Glu Ser Lys Asn Trp Lys Pro Pro Lys Asn Ala Leu Glu Asp Leu	
165 170 175	
ctt cag cag aag tcg ccg cca ccc cca gac gtg cct acc ctg gtc gtg	576
Leu Gln Gln Lys Ser Pro Pro Pro Asp Val Pro Thr Leu Val Val	
180 185 190	
cca tcc ccg ggc aca ccg ggc aca ccg gga acc ccg atc acc ccg gga	624
Pro Ser Pro Gly Thr Pro Gly Thr Pro Gly Thr Pro Ile Thr Pro Gly	
195 200 205	
acc ccg atc acc ccg gga acc cca atc aca ccc atc ccg gga gcg ccg	672

Thr Pro Ile Thr Pro Gly Thr Pro Ile Thr Pro Ile Pro Gly Ala Pro	
210 215 220	
gta act ccg atc aca cca acg ccc ggc act ccc gtc acg ccg gtg acc	720
Val Thr Pro Ile Thr Pro Thr Pro Gly Thr Pro Val Thr Pro Val Thr	
225 230 235 240	
ccg ggc aag ccg gtc acc ccg gtg acc ccg gtc aaa ccg ggc aca cca	768
Pro Gly Lys Pro Val Thr Pro Val Thr Pro Val Lys Pro Gly Thr Pro	
245 250 255	
ggc gag cca acc ccg atc acg ccg gtc acc ccc ccg gtc gcc ccg gcc	816
Gly Glu Pro Thr Pro Ile Thr Pro Val Thr Pro Pro Val Ala Pro Ala	
260 265 270	
aca ccg gca acc ccg gcc acg ccc gtt acc cca gct ccc gct cca cac	864
Thr Pro Ala Thr Pro Ala Thr Pro Val Thr Pro Ala Pro Ala Pro His	
275 280 285	
ccg cag ccg gct ccg gca ccg gcg cca tcg cct ggg ccc cag ccg gtt	912
Pro Gln Pro Ala Pro Ala Pro Ala Pro Ser Pro Gly Pro Gln Pro Val	
290 295 300	
aca ccg gcc act ccc ggt ccg tct ggt cca gca aca ccg ggc acc cca	960
Thr Pro Ala Thr Pro Gly Pro Ser Gly Pro Ala Thr Pro Gly Thr Pro	
305 310 315 320	
ggg ggc gag ccg gcg ccg cac gtc aaa ccc gcg gcg ttg gcg gag caa	1008
Gly Gly Glu Pro Ala Pro His Val Lys Pro Ala Ala Leu Ala Glu Gln	
325 330 335	
cct ggt gtg ccg ggc cag cat gcg ggc ggg ggg acg cag tcg ggg cct	1056
Pro Gly Val Pro Gly Gln His Ala Gly Gly Gly Thr Gln Ser Gly Pro	
340 345 350	
gcc cat gcg gac gaa tcc gcc gcg tcg gtg acg ccg gct gcg gcg tcc	1104
Ala His Ala Asp Glu Ser Ala Ala Ser Val Thr Pro Ala Ala Ala Ser	
355 360 365	
ggt gtc ccg ggc gca cgg gcg gcg gcc gcc gcg ccg agc ggt acc gcc	1152
Gly Val Pro Gly Ala Arg Ala Ala Ala Ala Ala Pro Ser Gly Thr Ala	
370 375 380	
gtg gga gcg ggc gcg cgt tcg agc gtg ggt acg gcc gcg gcc tcg ggc	1200
Val Gly Ala Gly Ala Arg Ser Ser Val Gly Thr Ala Ala Ala Ser Gly	
385 390 395 400	
gcg ggg tcg cat gct gcc act ggg cgg gcg ccg gtg gct acc tcg gac	1248
Ala Gly Ser His Ala Ala Thr Gly Arg Ala Pro Val Ala Thr Ser Asp	
405 410 415	
aag gcg gcg gca ccg agc acg cgg gcg gcc tcg gcg cgg acg gca cct	1296
Lys Ala Ala Ala Pro Ser Thr Arg Ala Ala Ser Ala Arg Thr Ala Pro	
420 425 430	
cct gcc cgc ccg ccg tcg acc gat cac atc gac aaa ccc gat cgc agc	1344
Pro Ala Arg Pro Pro Ser Thr Asp His Ile Asp Lys Pro Asp Arg Ser	

435	440	445	
gag tct gca gat gac ggt acg ccg gtg tcg atg atc ccg gtg tcg gcg Glu Ser Ala Asp Asp Gly Thr Pro Val Ser Met Ile Pro Val Ser Ala 450 455 460			1392
gct cgg gcg gca cgc gac gcc gcc act gca gct gcc agc gcc cgc cag Ala Arg Ala Ala Arg Asp Ala Ala Thr Ala Ala Ser Ala Arg Gln 465 470 475 480			1440
cgt ggc cgc ggt gat gcg ctg cgg ttg gcg cga cgc atc gcg gcg gcg Arg Gly Arg Gly Asp Ala Leu Arg Leu Ala Arg Arg Ile Ala Ala Ala 485 490 495			1488
ctc aac gcg tcc gac aac aac gcg ggc gac tac ggg ttc ttc tgg atc Leu Asn Ala Ser Asp Asn Asn Ala Gly Asp Tyr Gly Phe Phe Trp Ile 500 505 510			1536
acc gcg gtg acc acc gac ggt tcc atc gtc gtg gcc aac agc tat ggg Thr Ala Val Thr Thr Asp Gly Ser Ile Val Val Ala Asn Ser Tyr Gly 515 520 525			1584
ctg gcc tac ata ccc gac ggg atg gaa ttg ccg aat aag gtg tac ttg Leu Ala Tyr Ile Pro Asp Gly Met Glu Leu Pro Asn Lys Val Tyr Leu 530 535 540			1632
gcc agc gcg gat cac gca atc ccg gtt gac gaa att gca cgc tgt gcc Ala Ser Ala Asp His Ala Ile Pro Val Asp Glu Ile Ala Arg Cys Ala 545 550 555 560			1680
acc tac ccg gtt ttg gcc gtg caa gcc tgg gcg gct ttc cac gac atg Thr Tyr Pro Val Leu Ala Val Gln Ala Trp Ala Ala Phe His Asp Met 565 570 575			1728
acg ctg cgg gcg gtg atc ggt acc gcg gag cag ttg gcc agt tcg gat Thr Leu Arg Ala Val Ile Gly Thr Ala Glu Gln Leu Ala Ser Ser Asp 580 585 590			1776
ccc ggt gtg gcc aag att gtg ctg gag cca gat gac att ccg gag agc Pro Gly Val Ala Lys Ile Val Leu Glu Pro Asp Asp Ile Pro Glu Ser 595 600 605			1824
ggc aaa atg acg ggc cgg tcg cgg ctg gag gtc gtc gac ccc tcg gcg Gly Lys Met Thr Gly Arg Ser Arg Leu Glu Val Val Asp Pro Ser Ala 610 615 620			1872
gcg gct cag ctg gcc gac act acc gat cag cgt ttg ctc gac ttg ttg Ala Ala Gln Leu Ala Asp Thr Thr Asp Gln Arg Leu Leu Asp Leu Leu 625 630 635 640			1920
ccg ccg gcg ccg gtg gat gtc aat cca ccg ggc gat gag cgg cac atg Pro Pro Ala Pro Val Asp Val Asn Pro Pro Gly Asp Glu Arg His Met 645 650 655			1968
ctg tgg ttc gag ctg atg aag ccc atg acc agc acc gct acc ggc cgc Leu Trp Phe Glu Leu Met Lys Pro Met Thr Ser Thr Ala Thr Gly Arg 660 665 670			2016

gag gcc gct cat ctg cgg gcg ttc cgg gcc tac gct gcc cac tca cag	2064
Glu Ala Ala His Leu Arg Ala Phe Arg Ala Tyr Ala Ala His Ser Gln	
675 680 685	
gag att gcc ctg cac caa gcg cac act gcg act gac gcg gcc gtc cag	2112
Glu Ile Ala Leu His Gln Ala His Thr Ala Thr Asp Ala Ala Val Gln	
690 695 700	
cgt gtg gcc gtc gcg gac tgg ctg tac tgg caa tac gtc acc ggg ttg	2160
Arg Val Ala Val Ala Asp Trp Leu Tyr Trp Gln Tyr Val Thr Gly Leu	
705 710 715 720	
ctc gac cgg gcc ctg gcc gcc gca tgc tga	2190
Leu Asp Arg Ala Leu Ala Ala Ala Cys	
725	
